

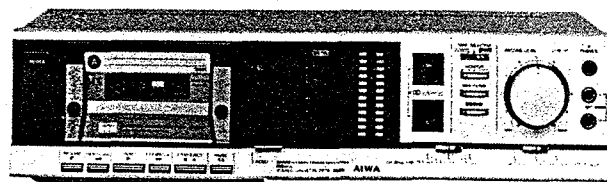
STEREO CASSETTE DECK

MODEL NO. AD-3500E, K

AIWA®

[SERVICE MANUAL]

Code No. 04-350-000-18



DATE OF ISSUE 7/1981

SPECIFICATIONS

Semiconductors:	8 ICs, 90 transistors, 75 diodes, 37 LED's	(WTD-A)	More than 68/76 dB (METAL, DOLBY NR B-type/C-type)
Power supply:	E model AC 220V, 50/60 Hz K model AC 240V, 50/60 Hz		More than 65/73 dB (CrO ₂ , DOLBY NR B-type/C-type)
Power consumption:	17W		More than 62/70 dB (LH, DOLBY NR B-type/C-type)
Dimensions:	420(W) x 110(H) x 250(D) mm	Channel separation:	More than 35 dB
Weight:	5.5 kg	(1 kHz, 0 VU)	
Track type:	4 tracks 2 channel	Crosstalk:	More than 60 dB
Tape speed:	4.8 cm/s ± 1.5%	(1 kHz, 0 VU)	
Wow and flutter:	Less than 0.035% (WRMS)	Erasing ratio:	More than 60 dB (METAL)
Automatic stop system:	Full auto stop	(125 Hz, 0 VU +10 dB)	
Automatic shut-off action time:	Less than 5s.	Bias frequency:	85 kHz
Pinch roller pressure:	125 ± 15g (1.23 ± 0.15N)	Frequency response:	METAL 20 ~ 19,000 Hz
Take-up torque:	35 ⁺¹⁵ -5 g-cm (343 ⁺¹⁴⁷ -49 mN·m)		CrO ₂ 20 ~ 17,000 Hz
FF & rewind torque:	110 ± 20 g-cm (1078 ± 196 mN·m)	Motor:	LH 20 ~ 16,000 Hz
FF & rewind time:	90 ± 5s. (C-60)	Head:	DC EG motor
Playback output:	720 ⁺⁸⁰ -70 mV (LINE)		DX head (for Rec/Pb)
Playback noise:	Less than 1.5mV (METAL, CrO ₂ , DOLBY NR B-type ON)	Inputs:	Ferrite head (for Erase)
	Less than 2.7 mV (LH DOLBY NR OFF)		MIC max. sensitivity 0.3 mV (200 Ω ~ 10 kΩ suitable)
Rec./PB output:	0 VU ± 1.5 dB (LINE)		LINE IN max. sensitivity 50 mV
Rec./Pb distortion:	Less than 1.5% (METAL) Less than 2.0% (CrO ₂) Less than 1.5% (LH)	Outputs:	(Optimum load impedance more than 50 kΩ)
Rec./Pb SN ratio:	More than 54/58 dB (METAL, DOLBY NR B-type OFF/ON)		Standard level 0.41V (0 VU)
	More than 53/58 dB (CrO ₂ , DOLBY NR B-type OFF/ON)		(Optimum load impedance more than 50 kΩ)
	More than 47/55 dB (LH, DOLBY NR B-type OFF/ON)		PHONES 8Ω

- Specifications and external appearance are subject to change without due to product improvement.
- Noise reduction system manufactured under license from Dolby Laboratories Licensing Corporation.
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DISASSEMBLY INSTRUCTIONS

1. Removing the Cabinet

- 1) Remove 8 screws. (See figure 1)

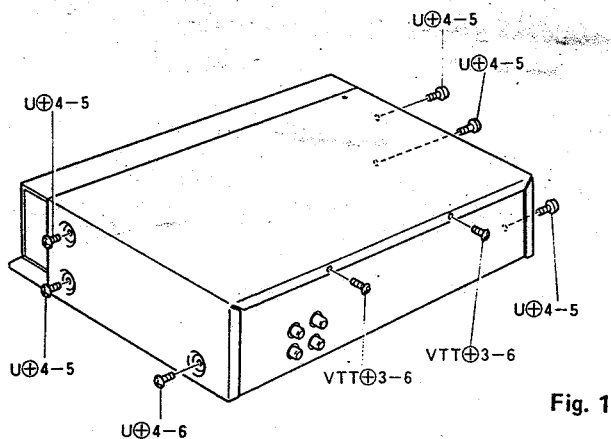


Fig. 1

2. Removing the cassette lid

- 1) Remove the cap using a small screwdriver, etc. because it is fastened to the screw of the cassette lid using both-side tape. (See figure 2)

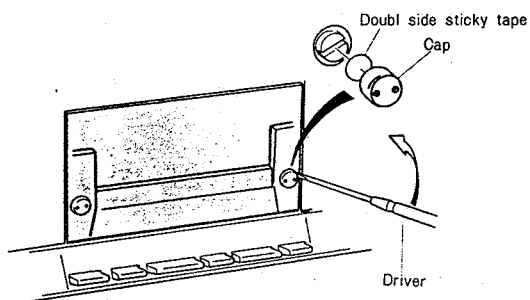


Fig. 2

3. Removing the front cabinet

- 1) Open the cassette lid (See figure 4)

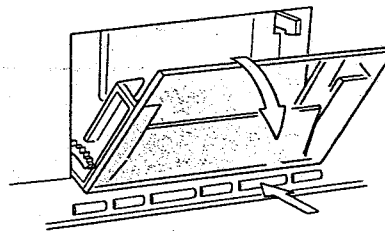


Fig. 4

- 2) Remove 3 screws to remove the front panel. (See figure 5)

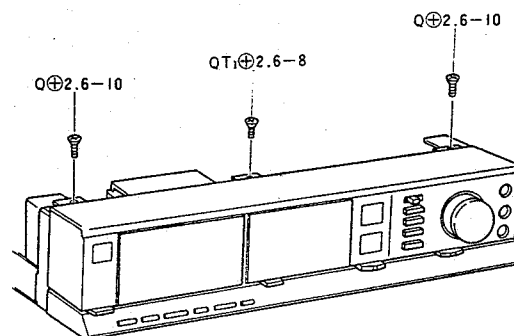


Fig. 5

- 2) Remove 2 screws. The nuts are removed together at this time: Be careful not to lose them. (See figure 3)

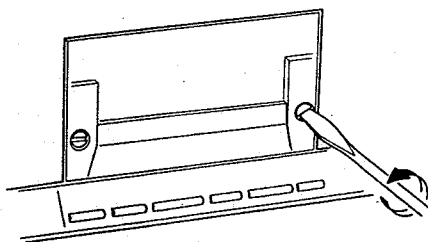
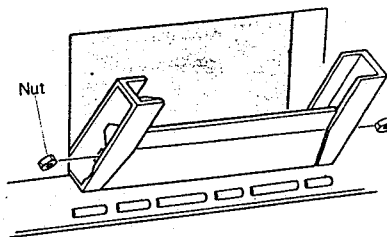


Fig. 3



- 3) Remove 7 screws. (See figure 6)

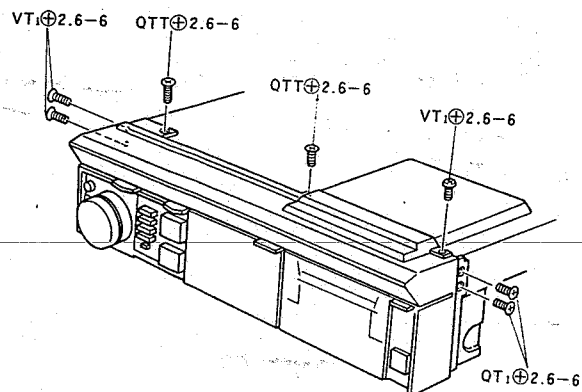


Fig. 6

- 6) Pull the Dolby B/C NR button toward you while pressing the tab of the POWER button. (See figure 9)

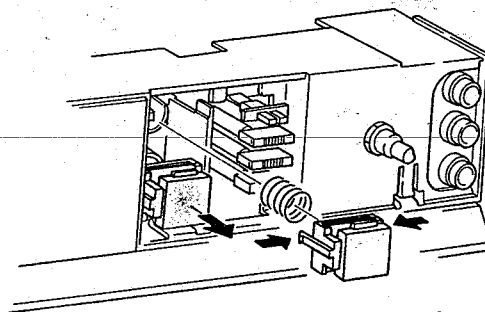


Fig. 9

- 4) Remove the REC knob and then remove 2 nuts. (See figure 7)

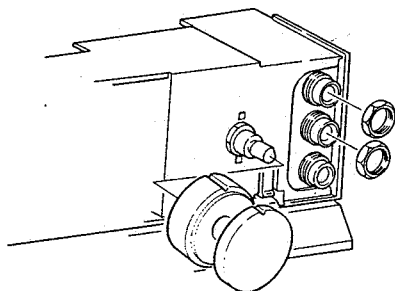


Fig. 7

- 5) Pull out the POWER button while depressing the tab of the POWER button. (See figure 8)

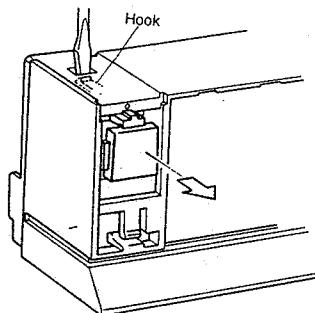


Fig. 8

- 7) Detach the tape selector button and remove 7 screws. (See figure 10)

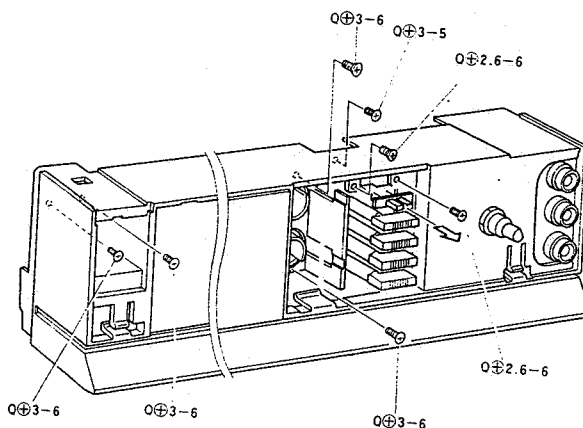


Fig. 10

4. Removing the mechanism

1) Open the cassette lid. (See figure 11)

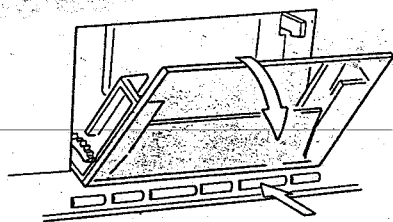


Fig. 11

4) Remove the mechanism while sliding it in the direction of the arrow. (See figure 14)

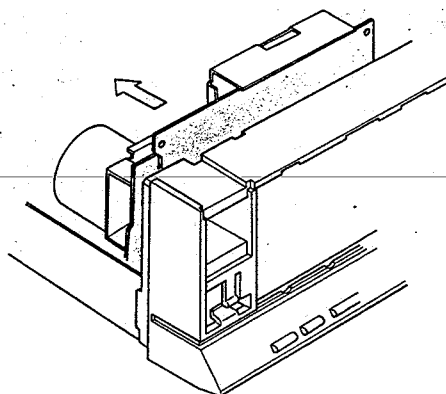


Fig. 14

2) Remove the slide switch with bond when installing the spring again. (See figure 12)

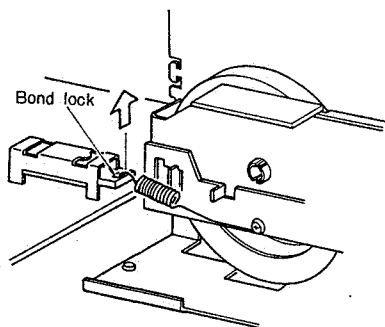


Fig. 12

5) Remove the counter belt. (See figure 15)

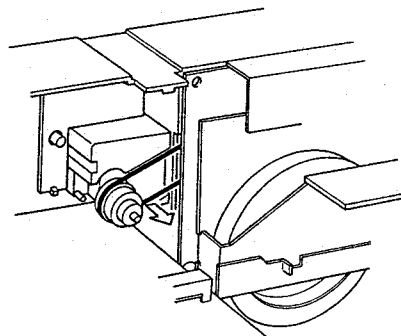


Fig. 15

3) Remove 4 screws. (See figure 13)

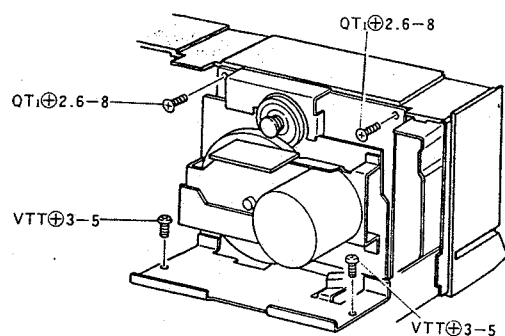


Fig. 13

6) With 2 screws of the repeat circuit board removed, the mechanism moves more freely facilitating work. (See figure 16)

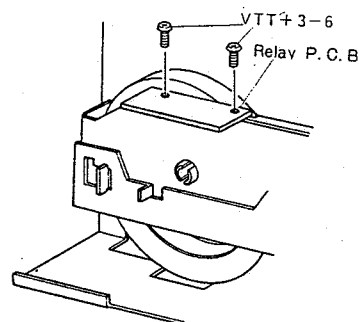


Fig. 16

5. Removing the LED circuit board-1 and LED module circuit board

LED circuit board-1

- 1) Remove the screw and remove the LED circuit board-1 while depressing the tab. (See figure 17)

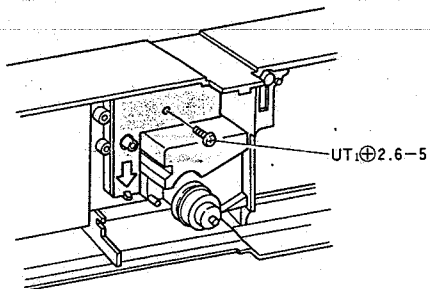


Fig. 17

6. Removing the Volume-1 circuit board

- 1) Remove 3 screws. (See figure 19)

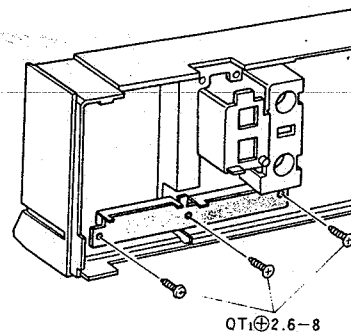


Fig. 19

LED module circuit board

- 1) Remove 2 screws. (See figure 18)

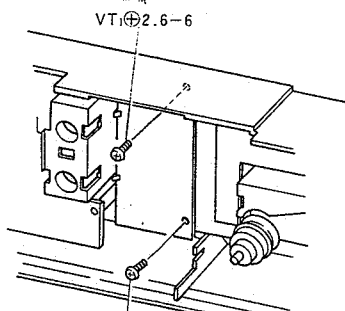
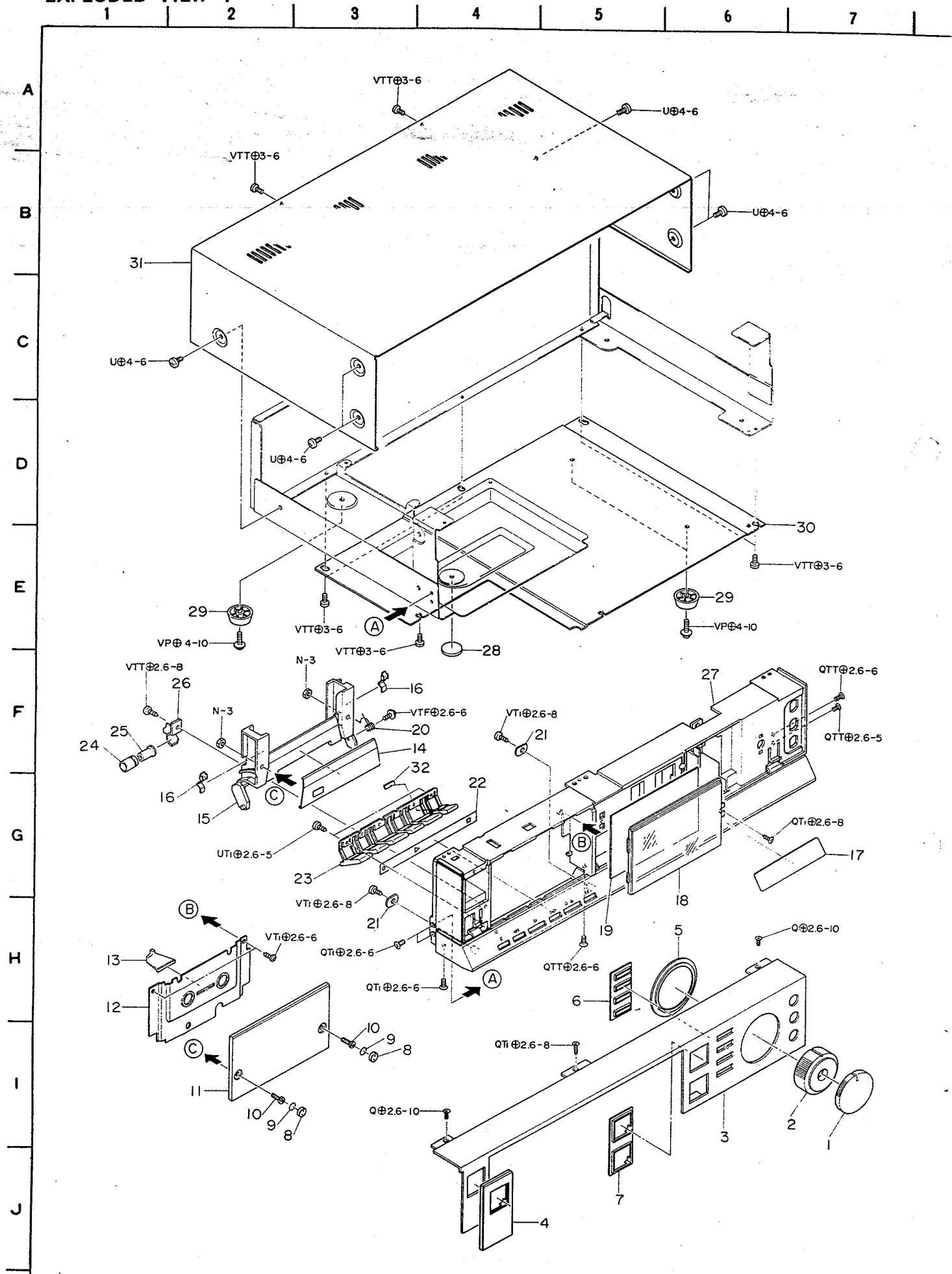


Fig. 18

EXPLODED VIEW-1



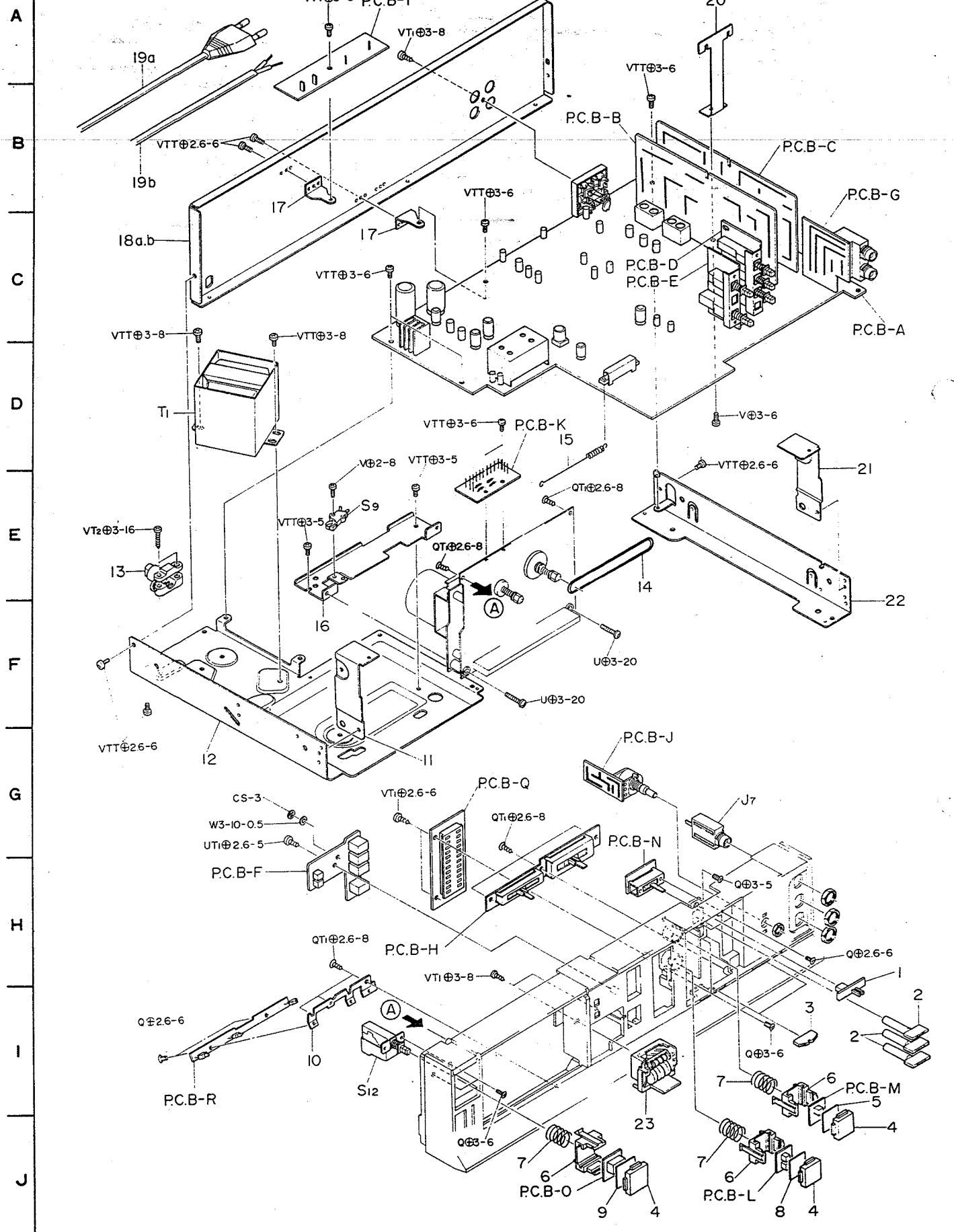
PARTS LIST

MECHANICAL PARTS

■ * mark in this part list shows exclusive part.

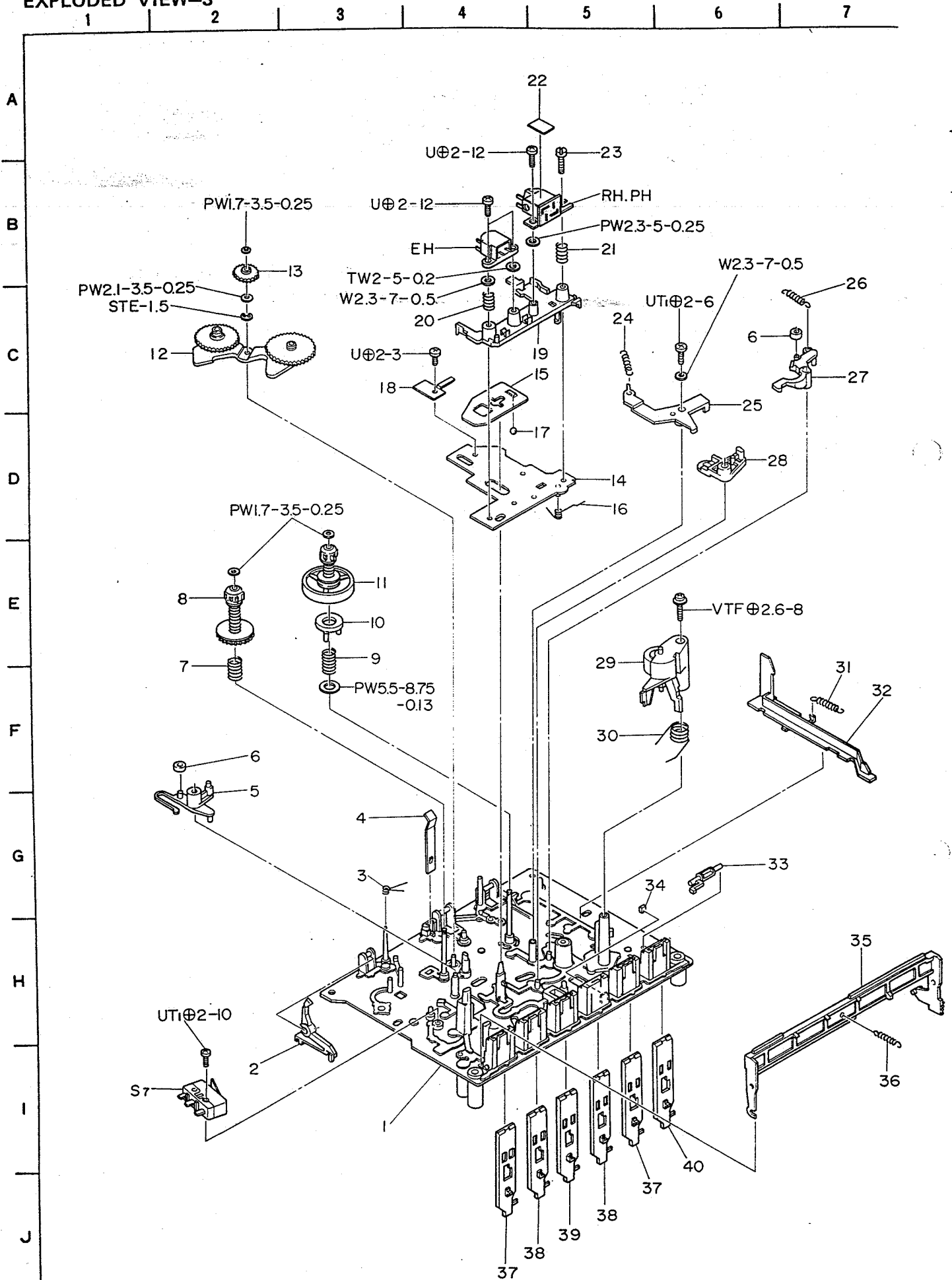
Ref. No.	Part No.	Part No. Changed to	Description	Common Model	Q'ty
1-1	82-175-026-01		REC A knob ass'y	*	1
1-2	82-175-029-01		Knob, REC B	*	1
1-3	82-175-002-01		Panel, Front EX	*	1
1-4	82-175-035-01		Plate, POWER	*	1
1-5	82-175-008-01		Decorative ring	*	1
1-6	82-175-032-01		Guide, FUNCTION	*	1
1-7	82-175-031-01		Guide, DOLBY	*	1
1-8	82-175-010-01		Cap	*	2
1-9	82-176-215-01		Adhesive sheet, 7φ	AD-3100	2
1-10	82-175-213-01		Screw 3-6.5	*	2
1-11	82-175-004-01		Window, Cassette	*	1
1-12	82-175-033-01		Cassette plate	*	1
1-13	82-304-044-01		Guide, Light	*	1
1-14	82-175-044-01		Decorative plate, Cassette	*	1
1-15	82-175-007-01		Cassette box, A	*	1
1-16	82-175-204-01		P-spring, Cassette holder	*	2
1-17	82-175-036-01		Instruction sheet, Bias	*	1
1-18	82-175-011-01		Window, Meter	*	1
1-19	82-175-014-01		Plate EX, Meter	*	1
1-20	82-175-212-01		T-spring, Cassette open	*	1
1-21	82-176-216-01		Leaf washer 9.6-13-0.8	AD-3100	2
1-22	82-176-218-01		Himeron cloth, Cabinet	AD-3100	1
1-23	82-175-034-01		Push-key	*	1
1-24	82-175-207-01		Oil-dump bearing	*	1
1-25	82-534-264-01		Gear, Oil-dump	*	1
1-26	82-175-210-01		Holder, Oil-dump	*	1
1-27	82-175-006-01		Cabinet, EX, Front	*	1
1-28	82-168-025-01		Rubber foot	*	1
1-29	87-085-161-01		Foot	*	3
1-30	82-168-018-01		Cabinet, Bottom	*	1
1-31	82-175-009-01		Cabinet, Steel	*	1

1	2	3	4	5	6	7
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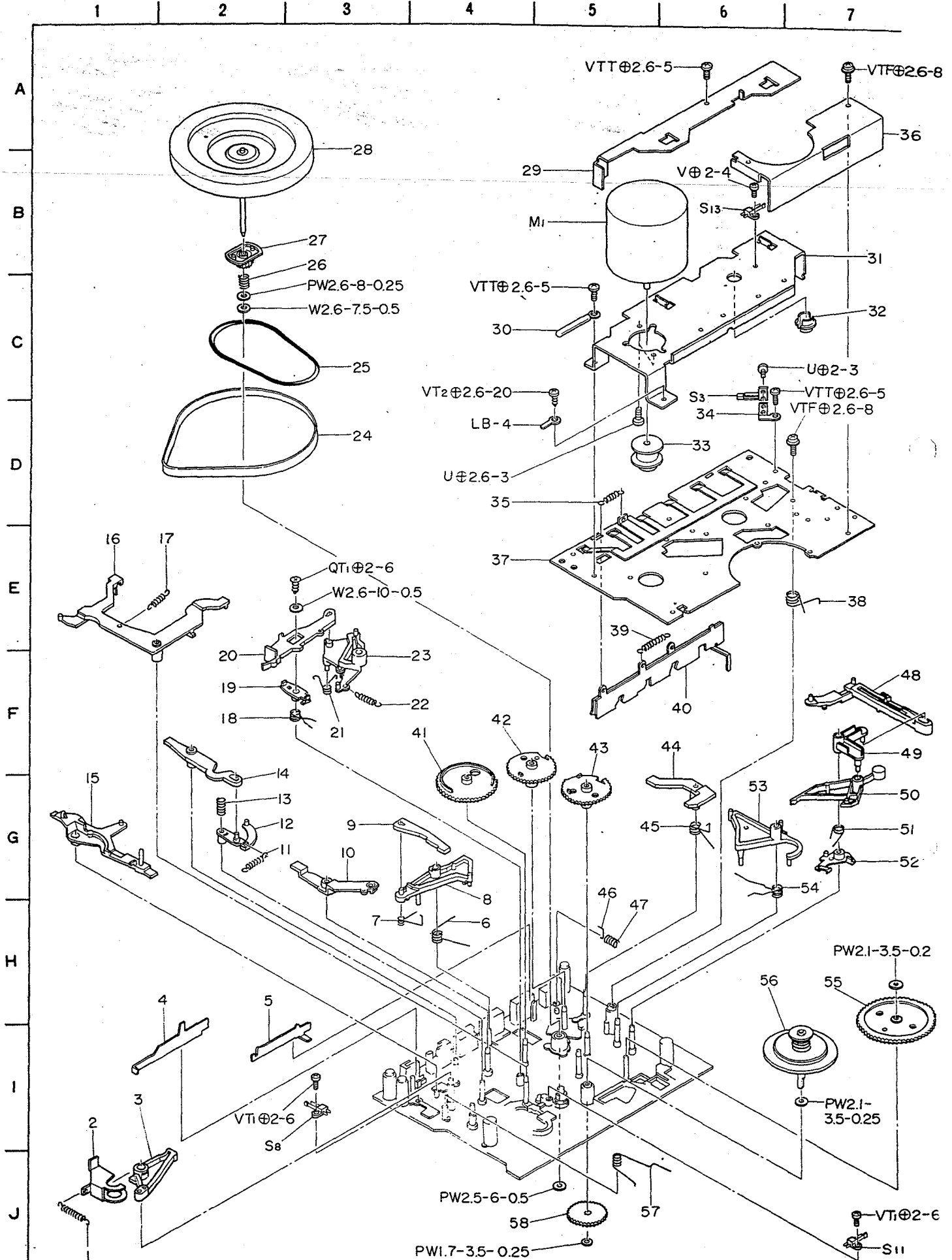
Ref. No.	Part No.	Part No. Changed to	Description	Common Model	Q'ty	
2-1	82-175-020-01		Knob, Slide switch A	*	1	
2-2	82-175-018-01		Push-button, FUNCTION A	*	3	
2-3	81-175-022-01		Knob, Slide Volume A	*	2	
2-4	82-175-013-01		Push-button, POWER A	*	3	
2-5	82-175-016-01		Plate, DOLBY	*	1	
2-6	82-175-203-01		Holder, POWER button	*	3	
2-7	82-175-205-01		C-spring, POWER	*	3	
2-8	82-175-017-01		Plate, B-C	*	1	
2-9	82-175-015-01		Plate, POWER	*	1	
2-10	82-175-202-01		Holder, Circuit board	*	1	
2-11	82-176-212-01		Holder, Cabinet L	AD-3100	1	
2-12	82-175-208-01		Chassis A, Amp.	*	1	
2-13	87-085-166-01		Holder, AC power cord		1	
2-14	82-538-210-01		Belt, Counter		1	
2-15	82-175-214-01		E-spring, ADMS	*	1	
2-16	82-175-211-01		Holder, Mechanism ass'y	*	1	
2-17	82-168-213-01		Holder, Circuit board		2	
2-18a	82-175-038-01		Panel, Rear E (E model only)	*	1	
2-18b	82-175-039-01		Panel Rear K (K model only)	*	1	
2-19a	87-034-877-01		AC power cord E (E model only)		1	
2-19b	87-034-872-01		AC power cord K (K model only)		1	
2-20	82-179-237-01		Holder, DOLBY circuit board		1	
2-21	82-175-209-01		Chassis B, Amp	*	1	
2-22	82-176-213-01		Holder, Cabinet R	AD-3100	1	
2-23	87-040-146-01		Counter		1	

EXPLODED VIEW-3



Ref. No.	Part No.	Part No. Changed to	Description	Common Model	Q'ty	
3-1	82-585-325-01		Outsert ass'y		1	
3-2	82-585-255-01		REC blocking lever		1	
3-3	82-585-294-01		T-spring, Center shift		1	
3-4	82-585-319-01		P-spring, Cassette holder		1	
3-5	82-585-252-01		Lever, Brake L		1	
3-6	82-585-286-01		G-cushion, Brake		2	
3-7	82-585-290-01		C-spring, Back tension		1	
3-8	82-585-215-01		Supply reel platform ass'y		1	
3-9	82-585-292-01		C-spring, Slip disk		1	
3-10	82-585-272-01		Slip disk T		1	
3-11	82-585-210-01		Take-up reel platform ass'y		1	
3-12	82-585-231-01		FR lever ass'y		1	
3-13	82-585-235-01		Gear, REW A		1	
3-14	82-585-235-01		Chassis, Actuating		1	
3-15	82-175-223-01		P-spring, Actuating	*	1	
3-16	82-585-295-01		T-spring, Actuating		1	
3-17	87-073-005-01		Steel ball 2φ		1	
3-18	82-585-349-01		Holder, Idler lever		1	
3-19	82-175-201-01		Head base	*	1	
3-20	82-175-215-01		C-spring, EH	*	1	
3-21	82-585-219-01		C-spring, RPH		1	
3-22	82-176-219-01		Azimuth adjust screw	AD-3100	1	
3-23	87-057-620-01		Label, Head		1	
3-24	82-585-313-01		E-spring, Play idler		1	
3-25	82-585-223-01		Play idler lever ass'y		1	
3-26	82-585-312-01		E-spring, Brake R		1	
3-27	82-585-253-01		Lever, Brake R		1	
3-28	82-585-265-01		Lever, REV		1	
3-29	82-585-364-01		Pinch lever B ass'y		1	
3-30	82-585-296-01		T-spring, Pinch lever		1	
3-31	82-585-311-01		E-spring, Lid lock		1	
3-32	82-585-254-01		Slide plate, Eject		1	
3-33	82-585-279-01		Eject lever A		1	
3-34	82-585-338-01		G-cushion, Play lever		1	
3-35	82-585-278-01		Lock plate		1	
3-36	82-585-317-01		E-spring, Lock button		1	
3-37	82-585-337-01		Plate, REC button		2	
3-38	82-585-343-01		Plate, FR A button		2	
3-39	82-585-277-01		Plate, FR button		1	
3-40	82-585-361-01		Plate, PAUSE button		1	

EXPLODED VIEW-4



Ref. No.	Part No.	Part No. Changed to	Description	Common Model	Q'ty	
4-1	82-585-314-01		E-spring, REC		1	
4-2	82-585-267-01		REC lever B		1	
4-3	82-585-266-01		REC lever A		1	
4-4	82-585-282-01		Slide plate, Motor switch		1	
4-5	82-585-283-01		Slide plate, FR auto		1	
4-6	82-585-306-01		T-spring, PLAY lever		1	
4-7	82-585-307-01		T-spring, REC lever		1	
4-8	82-585-249-01		Lever, PLAY		1	
4-9	82-585-250-01		Lever, REC drive		1	
4-10	82-585-258-01		Trigger lever, PLAY		1	
4-11	82-585-308-01		E-spring, REW lever		1	
4-12	82-585-260-01		Lever, REW		1	
4-13	82-439-369-01		Slip spring	TPR-300	1	
4-14	82-585-259-01		Trigger lever, REW		1	
4-15	82-175-217-01		Trigger lever, REC 2	*	1	
4-16	82-585-257-01		Trigger lever, FF		1	
4-17	82-585-301-01		E-spring, Trigger PLAY		1	
4-18	82-585-297-01		T-spring, FR lever A		1	
4-19	82-585-264-01		FR lever D		1	
4-20	82-175-218-01		FR lever C ₂	*	1	
4-21	82-585-298-01		T-spring, FR lever B		1	
4-22	82-585-311-01		E-spring, Lid lock		1	
4-23	82-585-262-01		FR lever B		1	
4-24	82-176-207-01		Rubber belt, Flywheel B	AD-3100	1	
4-25	82-585-336-01		Rubber belt, FR B		1	
4-26	82-176-208-01		C-spring, Flywheel B	AD-3100	1	
4-27	82-585-243-01		Gear, Flywheel		1	
4-28	82-585-229-01		Flywheel ass'y		1	
4-29	82-175-220-01		Slide plate, ADMS	*	1	
4-30	87-038-039-01		Wire binder		1	
4-31	82-175-222-01		Holder, Motor 2	*	1	
4-32	82-585-326-01		Thrust bearing B		1	
4-33	82-585-242-01		Motor pulley		1	
4-34	82-585-323-01		Holder, PAUSE switch		1	
4-35	82-585-315-01		E-spring, Slide plate		1	
4-36	82-176-217-01		Cover, Auto gear	AD-3100	1	
4-37	82-585-203-01		Mechanism chassis B ass'y		1	
4-38	82-585-321-01		T-spring, Auto kick		1	
4-39	82-585-332-01		E-spring, REC lock		1	
4-40	82-585-327-01		Slide plate key ass'y		1	
4-41	82-585-244-01		Gear, PLAY cam		1	
4-42	82-585-246-01		Gear, PAUSE cam		1	
4-43	82-585-245-01		Gear, FR cam		1	
4-44	82-585-256-01		Trigger lever, PAUSE		1	
4-45	82-585-304-01		T-spring, Trigger PAUSE		1	
4-46	82-585-362-01		Shaft lock B		1	
4-47	82-585-285-01		C-spring, Lock		1	
4-48	82-585-270-01		Plate, Auto kick		1	
4-49	82-585-269-01		Lever, auto B		1	
4-50	82-585-268-01		Lever, auto A		1	
4-51	82-585-299-01		T-spring, Auto eject		1	
4-52	82-585-271-01		Lever, Auto eject		1	
4-53	82-585-248-01		Lever, PAUSE		1	
4-54	82-585-300-01		T-spring, FR cam		1	
4-55	82-585-247-01		Gear, Auto kick		1	
4-56	82-585-217-01		Pully FR ass'y, Slip		1	
4-57	82-585-303-01		T-spring, Trigger REC		1	
4-58	82-585-216-01		Gear, Drive		1	

Circuit Description

DOLBY C NOISE REDUCTION

1. Outline

Noise reduction of about 10 dB at high frequencies was achieved using the conventional Dolby B noise reduction system; Dolby C Noise Reduction was designed so that this noise reduction could be increased to approximately 20 dB.

Basically, two Dolby B ICs are connected in series to encode and then decode the signal; that is, twice the number of ICs are used. Four ICs are required in a 2-head deck and eight in a 3-head deck.

There are two major differences between the Dolby C noise reduction circuit and that used for Dolby B.

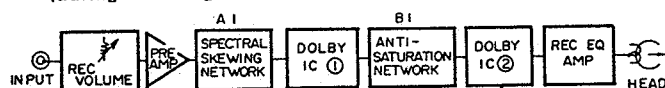
One is that the turnover frequency during encoding (and decoding) is 2 octaves lower so that it is effective from lower frequencies.

The other is that spectral skewing and anti-saturation networks are provided. High frequency MOL and tape saturation characteristics are improved by limiting the high frequency input signal at 10 kHz or more by these two circuits.

2. Block diagrams

2-1 Encoding

(during recording)



2-2 Decoding

(during playback)

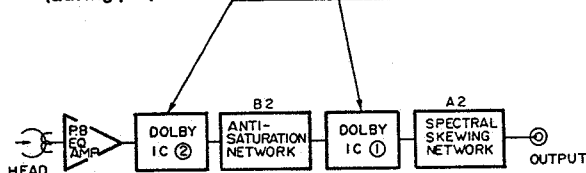


Fig. 1

Fig. 2

In encoding, the signal which has passed through the record VR passes through the spectral skewing network via the pre-amplifier. The spectral skewing network is an LC filter and it is provided to cut high frequency components; it has frequency characteristics of -1 dB up to 10 kHz and -5 dB at 15 kHz. Together with the anti-saturation network which consists of a C.R filter and through which the signal passes later, characteristics of -4 dB up to 10 kHz and -8 dB at 15 kHz are obtained. This improves high frequency MOL and tape saturation. After passing through the spectral skewing network, the signal enters Dolby IC(1) where the first encoding operation is performed.

Next it is fed to Dolby IC(2) after passing through the anti-saturation network, to obtain noise reduction of approximately 20 dB.

The peripheral circuits of the Dolby ICs are basically the same as those in Dolby B NR systems, the differences being the turnover frequency is different as described previously and the attack/recovery time is half that in Dolby B.

In the decode mode, the signal from the head enters Dolby IC(2) via the playback equalizer amp. The first stage of decoding is performed here, then the signal enters Dolby IC(1) via the anti-saturation network which has characteristics which are reverse those in encoding. This completes the decoding process which adds 20 dB to the signal to noise ratio. After this the signal passes through the spectral skewing network which again reverse characteristics to those in encoding before being output.

3. Circuit actually used

In this series of cassette decks, the Hitachi HA-11226 IC is used as the Dolby IC. This IC has Dolby circuits for 2 channels in a single package.

3-1 Encoding

The signal input from the REC terminal shown at the upper left of the circuit diagram passes through the spectral skewing network consisting of R100 (3.3k), L100 (36mH) and C100 (1800 pF). This network is turned on and off by Q100. Q100 turns on only when the Dolby NR switch is set to IN and the B/C select switch is set to C. The signal is input to the Dolby IC pin 2 via the MPX filter. The signal then output from pin 8 passes through the anti-saturation network consisting of R121 (2.7k), R123 (39k) and C12, (0.018 μ F) with semi-fixed resistor SFR102 provided for adjustment before being input to the 2nd Dolby IC pin 5.

The anti-saturation network is turned on and off by Q106. (Q106 is turned on and off in the same way as Q100). The signal input to pin 15 is given the full 20 dB noise reduction before being output from pin 9 from which it is input to the REC equalizer amplifier.

3-2 Decoding

The signal input from the PLAY input terminal enters pin 15 and is output from pin 9 after the 1st stage of decoding. From here it enters the anti-saturation network consisting of R106 (1.6k), R118 (15k) and C102 (0.047 μ F).

This network has characteristics which reverse the encoding characteristics and boost high frequencies. The network is switched on and off in the same way as the other networks. Next the level of the signal is adjusted by semi-fixed resistor SFR101 and the signal is input to pin 2 of the 2nd Dolby IC. The decoded output from pin 8 is input to the anti-saturation network.

This IC101 has characteristics complementary to those in encoding, that is high frequencies are boosted.

The network consists of L101 (36mH), C105 (1800pF) and R112 (3.3k); it is turned on and off by Q105 in the same way as the other networks.

3-3 Function of Q107

This transistor turns on together with Q103 and Q104 on the right when Dolby B NR is selected.

It is connected in parallel to R301 (13k) by grounding R107 (5.1k) connected to the emitter of Q107; the composite resistance becomes 3.3k and the turnover frequency of Dolby B using a 3.3k, 1% resistor are obtained when Q107 is turned on.

3-4 Function of Q103 and Q104

As with Q107, 0.1 μ F and 0.3 μ F capacitors are grounded when Dolby B is turned on. They are connected in series in Dolby C operation which halves the attack/recovery time.

3-5 Function of Q302, Q302

These transistors operate only in Dolby C operation. Their function is to improve the apparent dynamic characteristics and are connected between the middles of the 1st and 2nd Dolby ICs; they improve the attack/recovery times of the ICs and act as limiters when excessive input is applied.

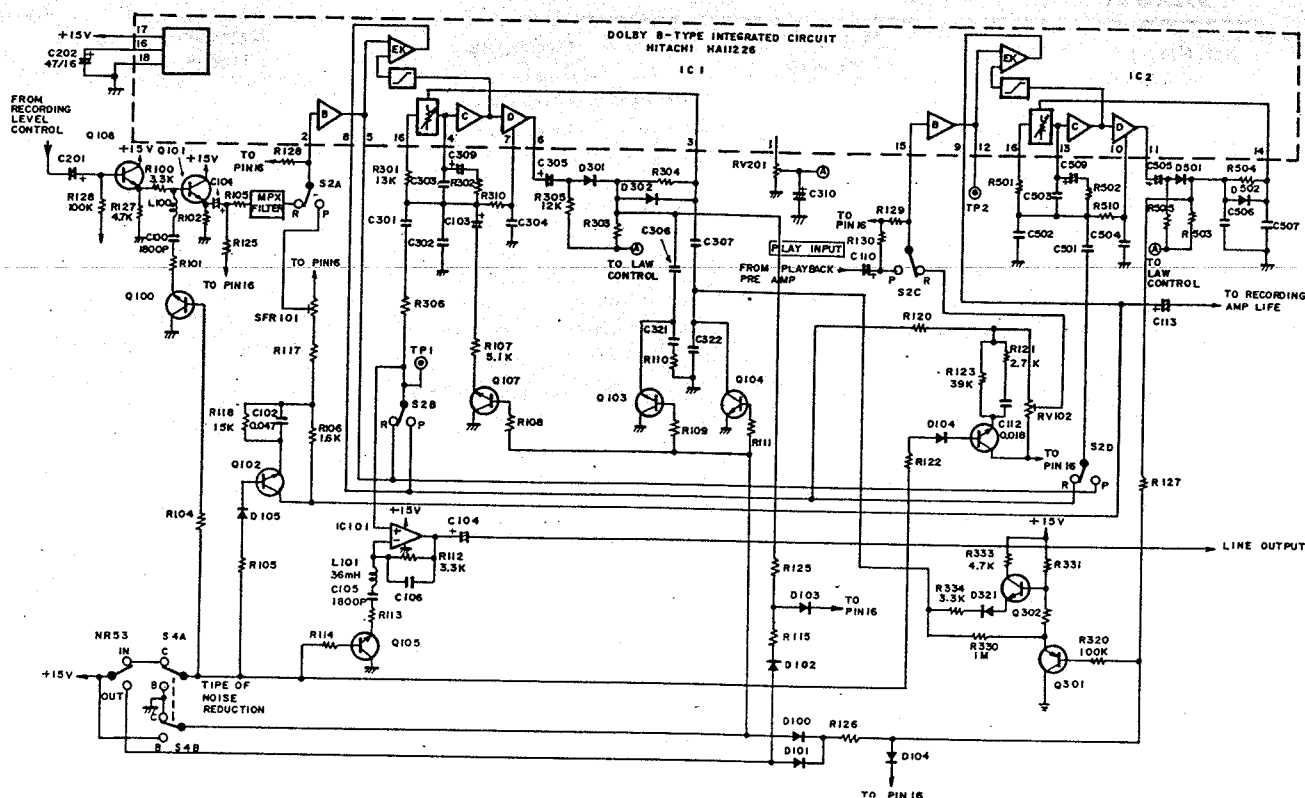


Fig. 3

3-6 Supplementary information

- 1) The spectral skewing network is outside the Dolby IC
- 2) The anti-saturation network is provided between IC1 and IC2.
- 3) In Dolby B operation, only IC1 works and IC2 is used as a flat amplifier with no encoding and decoding characteristics.

- Data on improvement of high frequency MOL characteristics due to spectral skewing network and anti-saturation network.

4. Adjustment of cassette deck

4-1 Adjustment of Dolby circuit Refer to wiring diagram 2

4-2 P.B. frequency characteristics (TTA-117E)

Output at 10 kHz should be 1 dB above that at 1 kHz.

4-3 REC/P.B. sensitivity/frequency characteristics

Standard tape	Metal tape	→ TTA-119MX
	FeCr tape	→ TTA-119E
	CrO ₂ tape	→ TTA-119G
	LH tape	→ TTA-119J

Sensitivity should be in the range 0 to +0.5 dB for all types of tape.

Frequency characteristics: Output at 10 kHz should be 1 dB above that at 1 kHz.

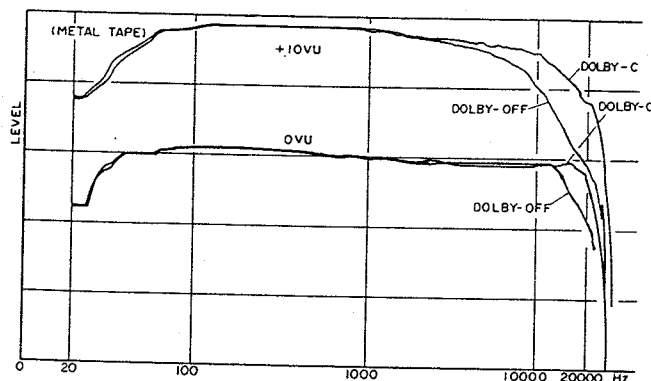


Fig. 4

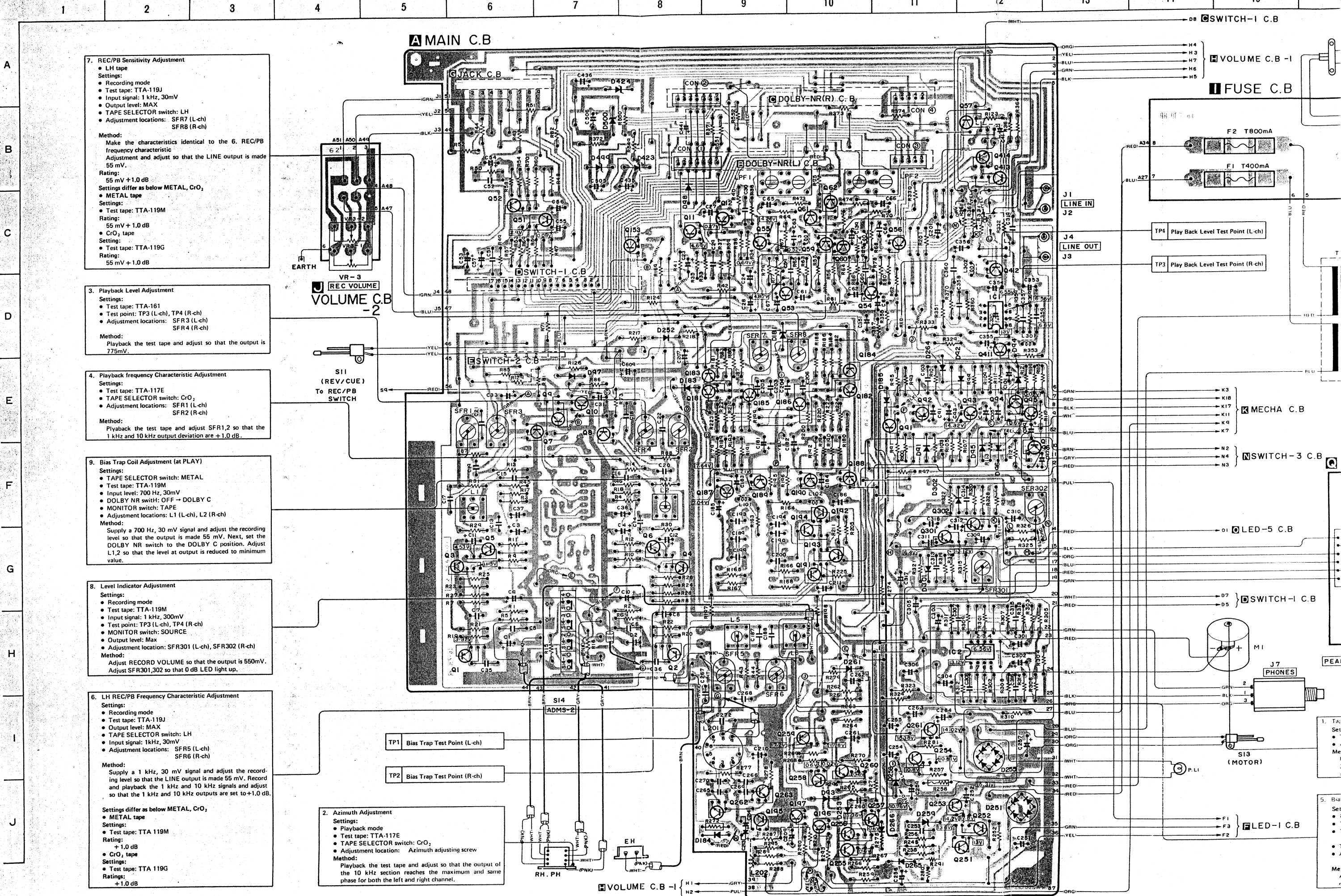
ACCESSORIES/PACKAGE

Ref. No.	Part No.	Part No. Changed to	Description	Common Model	Q'ty	
1	82-175-851-01		Printed indiv., Packing	*	1	
2	82-176-852-01		Cushion L, Printed indiv.	AD-3100	1	
3	82-176-853-01		Cushion R, Printed indiv.	AD-3100	1	
4	87-056-607-01		Poly-vinyl sack		1	
5	87-051-135-11		Poly-vinyl sack		1	
6	82-175-901-01		Instructions booklet (E model only)	*	1	
7	82-175-902-01		Instructions booklet (K model only)	*	1	
8	87-056-009-41		Distributors list		1	
9	87-056-008-01		Label, AC power cord (K model only)		1	
10	87-051-175-01		Poly-tube A		1	
11	86-944-012-01		Connection cord, CW-129BSK		2	

AIWACO., LTD.

WIRING-1

NOTES (1) B(+) Pattern Others pattern
(2) The voltage is the reference value measured with a tester (20 K ohm)
An asterisk (*) indicates that the value was measured with a vacuum



7. REC/PB Sensitivity Adjustment
• LH tape
Settings:
• Recording mode
• Test tape: TTA-119J
• Input signal: 1 kHz, 30mV
• Output level: MAX
• TAPE SELECTOR switch: LH
• Adjustment locations: SFR7 (L-ch)
SFR8 (R-ch)
Method:
Make the characteristics identical to the 6. REC/PB frequency characteristic
Adjustment and adjust so that the LINE output is made 55 mV.
Rating:
55 mV +1.0 dB
Settings differ as below METAL, CrO₂
• METAL tape
Settings:
• Test tape: TTA-119M
Rating:
55 mV +1.0 dB
• CrO₂ tape
Setting:
• Test tape: TTA-119G
Rating:
55 mV +1.0 dB

3. Playback Level Adjustment
Settings:
• Test tape: TTA-161
• Test point: TP3 (L-ch), TP4 (R-ch)
• Adjustment locations: SFR3 (L-ch)
SFR4 (R-ch)
Method:
Playback the test tape and adjust so that the output is 775mV.

4. Playback frequency Characteristic Adjustment
Settings:
• Test tape: TTA-117E
• TAPE SELECTOR switch: CrO₂
• Adjustment locations: SFR1 (L-ch)
SFR2 (R-ch)
Method:
Playback the test tape and adjust SFR1,2 so that the 1 kHz and 10 kHz output deviation are +1.0 dB.

9. Bias Trap Coil Adjustment (at PLAY)
Settings:
• TAPE SELECTOR switch: METAL
• Test tape: TTA-119M
• Input level: 700 Hz, 30mV
• DOLBY NR switch: OFF → DOLBY C
• MONITOR switch: TAPE
• Adjustment locations: L1 (L-ch), L2 (R-ch)
Method:
Supply a 700 Hz, 30 mV signal and adjust the recording level so that the output is made 55 mV. Next, set the DOLBY NR switch to the DOLBY C position. Adjust L1,2 so that the level at output is reduced to minimum value.

8. Level Indicator Adjustment
Settings:
• Recording mode
• Test tape: TTA-119M
• Input signal: 1 kHz, 300mV
• Test point: TP3 (L-ch), TP4 (R-ch)
• MONITOR switch: SOURCE
• Output level: Max
• Adjustment location: SFR301 (L-ch), SFR302 (R-ch)
Method:
Adjust RECORD VOLUME so that the output is 550mV. Adjust SFR301,302 so that 0 dB LED light up.

6. LH REC/PB Frequency Characteristic Adjustment
Settings:
• Recording mode
• Test tape: TTA-119J
• Output level: MAX
• TAPE SELECTOR switch: LH
• Input signal: 1kHz, 30mV
• Adjustment locations: SFR5 (L-ch)
SFR6 (R-ch)
Method:
Supply a 1 kHz, 30 mV signal and adjust the recording level so that the LINE output is made 55 mV. Record and playback the 1 kHz and 10 kHz signals and adjust so that the 1 kHz and 10 kHz outputs are set to +1.0 dB.
Settings differ as below METAL, CrO₂
• METAL tape
Settings:
• Test tape: TTA 119M
Rating:
+1.0 dB
• CrO₂ tape
Settings:
• Test tape: TTA 119G
Rating:
+1.0 dB

2. Azimuth Adjustment
Settings:
• Playback mode
• Test tape: TTA-117E
• TAPE SELECTOR switch: CrO₂
• Adjustment location: Azimuth adjusting screw
Method:
Playback the test tape and adjust so that the output of the 10 kHz section reaches the maximum and same phase for both the left and right channel.

VOLUME C.B -1
FUSE C.B.

F2 T800mA
F1 T400mA

TP4 Play Back Level Test Point (L-ch)
TP3 Play Back Level Test Point (R-ch)

MECHA C.B.
SWITCH-3 C.B.

LED-5 C.B.

SWITCH-1 C.B.

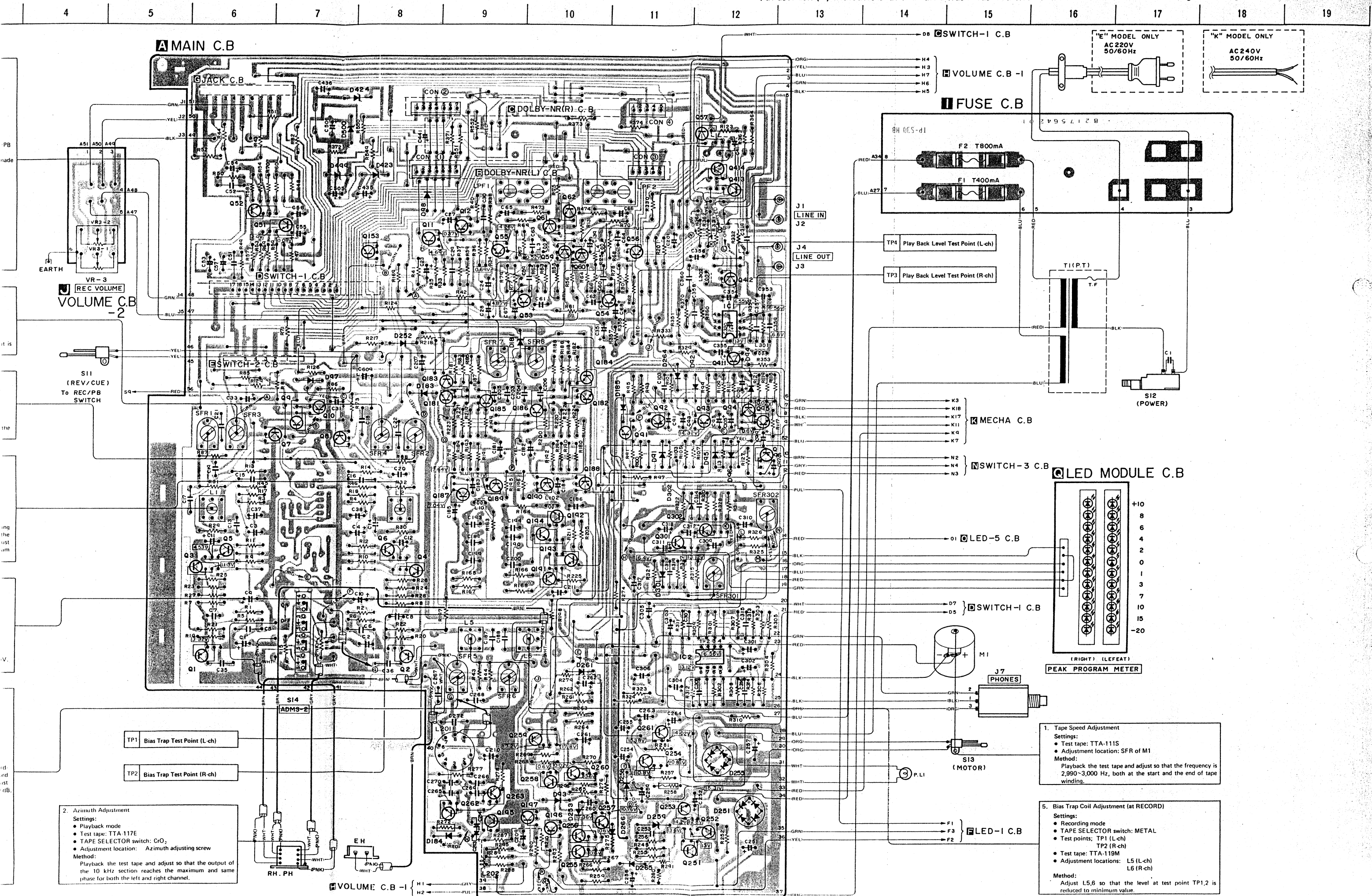
J7 PHONES

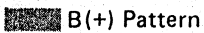
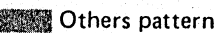
S13 (MOTOR)

LED-1 C.B.

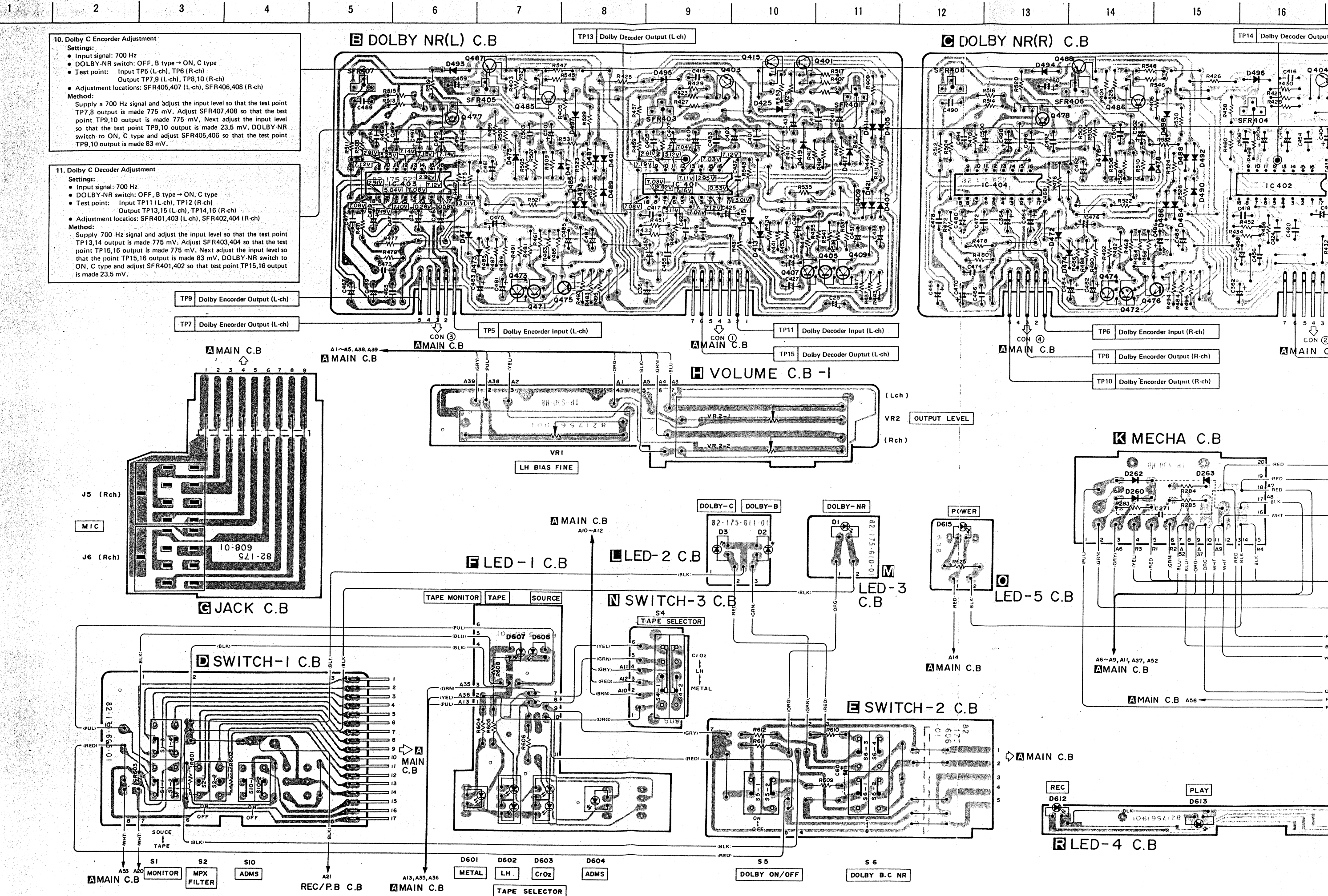
1. Tap
Sett
• T
• A
Met
P
2
• T
• A
Met
A
F

5. Bias
Sett
• P
• T
• T
• A
Met
A
F

NOTES (1)  B(+) Pattern  Others pattern(2) The voltage is the reference value measured with a tester (20 K ohms/V DC) when there are no signals.
An asterisk (*) indicates that the value was measured with a vacuum-tube voltmeter during recording.

- NOTES (1)  B(+) Pattern  Others pattern
- (2) The voltage is the reference value measured with a tester (20 K ohms/V DC) when there are no signals. An asterisk (*) indicates that the value was measured with a vacuum-tube voltmeter during recording.

WIRING-2

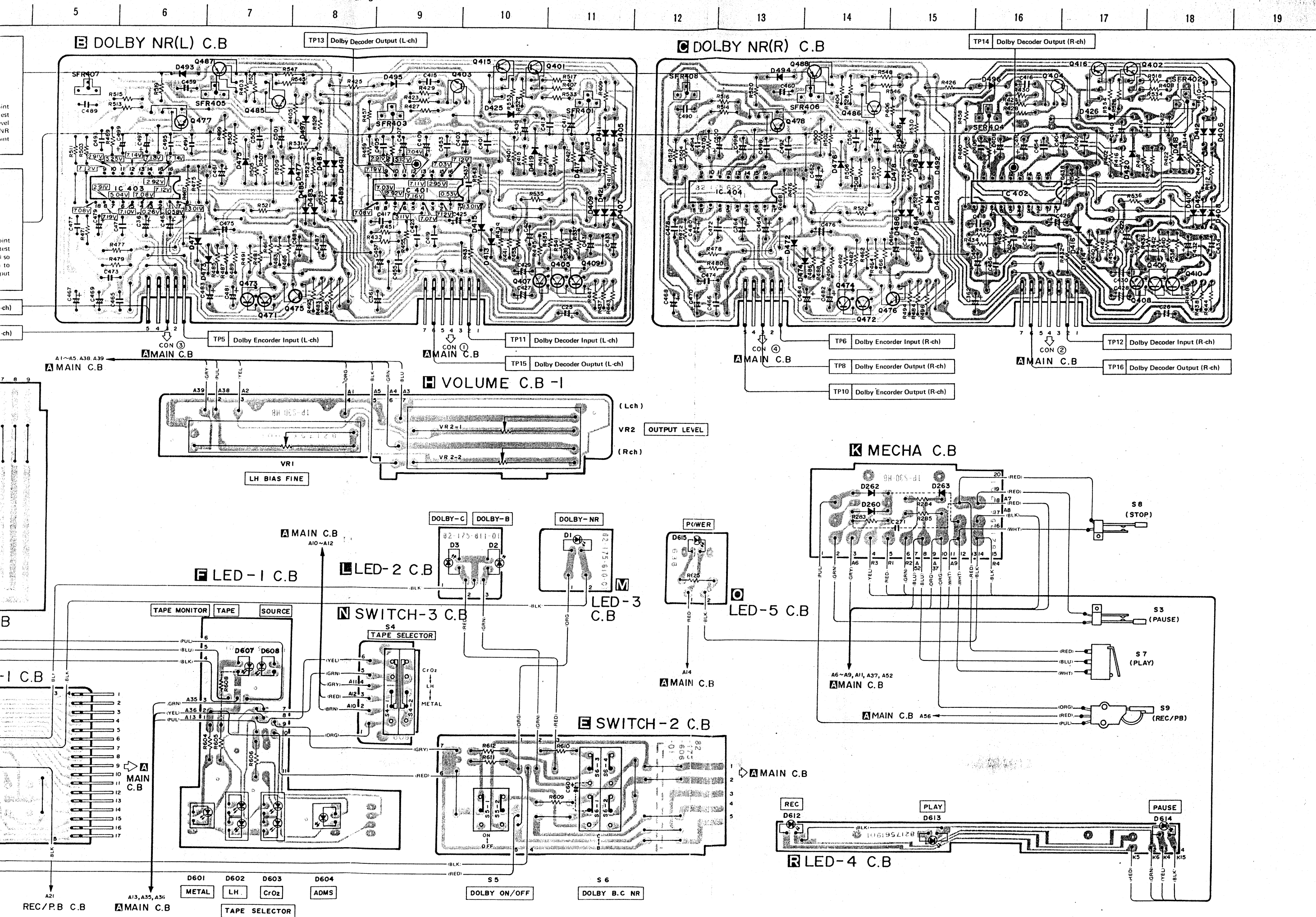


Others pattern
ce value measured with a tester (20 K ohms/V DC) when there are no signals.
that the value was measured with a vacuum-tube voltmeter during recording.

AD-3500E,K

AD-3500E,K

AIWA



ELECTRICAL MAIN PARTS LIST

Symbol No.	Part No.	Description
◀ MAIN CIRCUIT BOARD SECTION ▶		
PCB-A	*	Main circuit board
IC1	87-027-235-01	IC, NJM4558D
IC2	87-027-739-01	IC, NJM4556D
Q1,2	89-109-922-01	Transistor, 2SA992
Q3,4,5,6, 11,12,51, 52,53,54, 55,56,57, 187,188 189,190	89-309-456-01	Transistor, 2SC945L(P)
Q7,8,9,10, 93,94,95, 153,181, 182,183, 184,185, 186,191, 192,193, 194,196, 197,252, 253,255, 256,257, 258,260, 301,302, 411,412	89-318-155-01	Transistor, 2SC1815(GR)
Q59,60,61, 62,91,413, 414	89-320-011-01	Transistor, 2SC2001(K)
Q195,261, 262,263	89-313-833-01	Transistor, 2SC1383(R)
Q92,96	89-110-155-01	Transistor, 2SA1015(GR)
Q251	89-408-804-51	Transistor, 2SD880Y(GR)
Q254	89-404-412-01	Transistor, 2SD414(P)
Q259	89-107-335-01	Transistor, 2SA733(K)
D91,92,93, 94,95,96, 97,98,183, 184,185,252 253,264, 266	87-027-097-01	Diode, 1S1555
D181	87-027-555-01	Zener diode, HZ5C2
D251,255	87-027-163-01	Diode, 1B4B1
D258	87-027-556-01	Zener diode, HZ11B3
D259	87-027-633-01	Zener diode, HZ9A2
D261,265	87-027-365-01	Diode, S5277B
D301,302	88-052-188-01	Diode, 1S188(FM)
D423,424 499,500	87-027-399-01	Zener diode, HZ7A3L
L1,2,5,6	87-005-127-01	Coil, 22mH
L3,4,301, 302	87-005-147-01	Coil, 36mH
L101,102	87-005-093-01	Micro inductor coil, 4.7mH
L201	82-175-631-01	Bias OSC coil
L202	82-401-661-01	Choke coil, 600μH
LPF1,2	87-030-061-01	Low-pass filter, 85K
J1,2,3,4	87-049-055-01	Pin jack, 4P (LINE IN L, R, LINE OUT L, R)
S14	82-175-623-01	Slide switch (ADMS)
SFR1,2,3, 4,7,8	87-021-569-01	Semi-fixed resistor, 50kΩ-B
SFR5,6	87-021-570-01	Semi-fixed resistor, 100kΩ-B
SFR301,302	87-021-574-01	Semi-fixed resistor, 30kΩ-B
CON3,4	87-032-575-01	Connector, 5P
CON1,2	87-032-577-01	Connector, 7P

Symbol No.	Part No.	Description
⚠ R258	87-029-066-01	< Resistors > 1.5Ω ½w Fuse resistor
⚠ R272	87-029-017-01	10Ω ¼w Fuse resistor
C1,2	87-015-246-01	< Capacitors > 4.7μF 25V Electrolytic LL
C255	87-015-466-51	330μF 25V Electrolytic
C261	87-015-519-01	470μF 25V Electrolytic
C257	87-015-459-01	1000μF 25V Electrolytic
C254	87-015-480-01	220μF 16V Electrolytic
C435,436 505,506	87-015-477-01	470μF 16V Electrolytic
C187,188	87-014-037-01	150pF PP
C272	82-175-632-01	2700pF 630V PP
◀ DOLBY-NR (L) CIRCUIT BOARD SECTION ▶		
PCB-B	82-175-622-11	Dolby-NR (L) circuit board
IC401,403	87-027-738-01	IC, HA11226
Q401,403, 405,407, 409,471, 473,475, 477,485	89-318-155-01	Transistor, 2SC1815(GR)
Q415,487	89-110-155-01	Transistor, 2SA1015(GR)
D405,407, 409,411, 413,417, 421,473, 477,483, 485,487, 489,491, 493,495	87-027-097-01	Diode, 1S1555
D415,419, 425,471, 475,497	88-052-188-11	Diode, 1S188(FM)
SFR401,405 SFR403,407	87-021-634-01	Semi-fixed resistor, 10kΩ-B
PIN	87-021-626-01	Semi-fixed resistor, 2kΩ-B
PIN	87-032-635-01	Pin, 5P
PIN	87-032-637-01	Pin, 7P
R435,481	87-025-271-01	< Resistors > 5.1kΩ ¼w Metal film resistor
R401,431, 475,499	87-025-272-01	13kΩ ¼w Metal film resistor
C407	87-015-895-01	< Capacitors > 0.39μF 50V Electrolytic
C411,501	87-015-427-01	0.15μF 25V Aluminum solid
C429,431	87-015-429-01	0.33μF 25V Aluminum solid
C401,405, 417,419, 471,473, 474,491, 493	87-014-118-01	0.015μF PP
◀ DOLBY-NR (R) CIRCUIT BOARD SECTION ▶		
PCB-C	82-175-622-11	Dolby-NR (R) circuit board
IC402,404, Q402,404, 406,408, 416,472, 474,476, 478,486	87-027-738-01 89-318-155-01	IC, HA11226 Transistor, 2SC1815(GR)

Symbol No.	Part No.	Description
Q416,488 D406,408 410,412, 414,418, 422,474, 478,484, 486,488, 490,492, 494,496 D416,420, 426,472, 476,498	89-110-155-01 87-027-097-01	Transistor, 2SA1015(GR) Diode, 1S1555
SFR402,406 SFR404,408 PIN PIN	88-052-188-11 87-021-634-01 87-021-626-01 87-032-635-01 87-032-637-01	Diode, 1S188(FM) Semi-fixed resistor, 10kΩ-B Semi-fixed resistor, 2kΩ-B Pin, 5P Pin, 7P
R436,482	87-025-271-01	< Resistors > 5.1kΩ ¼w Metal film resistor
R402,432, 476,500	87-025-272-01	13kΩ ¼w Metal film resistor
C408 C412,502 C430,432 C402,406, 418,420, 472,492, 494	87-015-895-01 87-015-427-01 87-015-429-01 87-014-118-81	< Capacitors > 0.39μF 50V Electrolytic 0.15μF 25V Aluminum solid 0.33μF 25V Aluminum solid 0.015μF PP
◀ SWITCH-1 CIRCUIT BOARD SECTION ▶		
PCB-D S1,2,10	* 82-175-628-01	Switch-1 circuit board Push-switch (MONITOR, MPX FILTER, ADMS)
PIN	87-032-647-01	Pin, 17P
◀ SWITCH-2 CIRCUIT BOARD SECTION ▶		
PCB-E S5,6	* 82-175-627-01	Switch-2 circuit board Push-switch (DOLBY-NR, DOLBY B/C)
◀ LED-1 CIRCUIT BOARD SECTION ▶		
PCB-F D601,604 D602 D603 D607,608	* 87-027-775-01 87-027-776-01 87-027-777-01 87-027-774-01	LED-1 circuit board LED, LT-9030DI LED, LT-9030N LED, LT-9030H LED, GL-9HY4
◀ JACK CIRCUIT BOARD SECTION ▶		
PCB-G J5,6	* 87-049-057-01	Jack circuit board Jack 6.3φ (MIC)
◀ VOLUME CIRCUIT BOARD-1 SECTION ▶		
PCB-H VR1	* 82-175-625-01	Volume circuit board-1 Slide volume, 1kΩ-B (LH BIAS FINE)
VR2	82-175-624-01	Slide volume, 10kΩ-B (OUTPUT LEVEL)
◀ FUSE CIRCUIT BOARD SECTION ▶		
⚠ PCB-I ⚠ F1 ⚠ F2	* 87-035-218-01 87-098-012-01 87-035-221-01 87-098-015-01	Fuse circuit board Fuse, "T" 400mA Fuse label "T" 400mA Fuse, "T" 800mA Fuse label "T" 800mA

Symbol No.	Part No.	Description
	87-033-147-01	Fuse clamp
◀ VOLUME CIRCUIT BOARD-2 SECTION ▶		
PCB-J VR3	* 87-021-679-01	Volume circuit board-2 Volume, 50kΩ-A
◀ MECHA CIRCUIT BOARD SECTION ▶		
PCB-K D260,262, 263	* 87-027-097-01	Mecha circuit board Diode, 1S1555
◀ LED-2 CIRCUIT BOARD SECTION ▶		
PCB-L D2 D3	82-175-611-11 87-027-773-01 87-027-772-01	LED-2 circuit board LED, GL-9NG4 LED, SLP-152B
◀ LED-3 CIRCUIT BOARD SECTION ▶		
PCB-M D1	* 87-027-772-01	LED-3 circuit board LED, GL9PR4
◀ SWITCH-3 CIRCUIT BOARD SECTION ▶		
PCB-N S4	* 82-160-628-01	Switch-3 circuit board Slide switch (TAPE SELECTOR)
◀ LED-5 CIRCUIT BOARD SECTION ▶		
PCB-O D615	82-175-646-01 87-027-775-01	LED-5 circuit board LED, LT-9030DI
◀ LED MODULE CIRCUIT BOARD SECTION ▶		
PCB-Q	87-027-759-01	LED module circuit board
◀ LED-4 CIRCUIT BOARD SECTION ▶		
PCB-R D612 D613 D614	82-175-619-01 87-027-646-01 87-027-648-01 87-027-647-01	LED-4 circuit board LED, SEL1112(R) LED, SEL1331(G) LED, SEL1941(D)
◀ MISCELLANEOUS ▶		
⚠ T1 PL1 RPH EH M1 S3 S7 S8 S9 S11 ⚠ S12 S13 J7 ⚠ ⚠ ⚠ ⚠ C1	82-175-603-01 82-175-630-01 87-046-199-01 87-046-196-01 87-045-135-01 87-031-361-01 87-031-537-01 87-031-669-01 87-031-491-01 87-031-615-01 87-031-640-01 87-031-548-01 82-168-633-01 87-034-877-01 87-034-872-01 87-085-166-01 87-019-104-01	Power transformer Pilot lamp 15V 50mA REC/PB head Erase head Motor, DC-EG Leaf switch (PAUSE) Micro switch (PLAY) Leaf switch (STOP) Micro switch (REC/PB) Leaf switch (REV/CUE) Push switch (POWER) Leaf switch (MOTOR) Headphone jack (PHONES) AC power cord (E model only) AC power cord (K model only) Holder, AC power cord < Capacitor > 0.01μF Spark killer

⚠ Safety component symbol
This symbol is given to important parts which serve to maintain the safety of the product, and which are made to conform to special safety specifications. Therefore, when replacing a component with this symbol, make absolutely sure that you use a designated part.

Symbol No.	Part No.	Description
△R258	87-029-066-01	< Resistors > 1.5Ω ½w Fuse resistor
△R272	87-029-017-01	10Ω ½w Fuse resistor
C1,2	87-015-246-01	< Capacitors > 4.7μF 25V Electrolytic LL
C255	87-015-466-51	330μF 25V Electrolytic
C261	87-015-519-01	470μF 25V Electrolytic
C257	87-015-459-01	1000μF 25V Electrolytic
C254	87-015-480-01	220μF 16V Electrolytic
C435,436	87-015-477-01	470μF 16V Electrolytic
505,506		
C187,188	87-014-037-01	150pF PP
C272	82-175-632-01	2700pF 630V PP
<< DOLBY-NR (L) CIRCUIT BOARD SECTION >>		
PCB-B	82-175-622-11	Dolby-NR (L) circuit board
IC401,403	87-027-738-01	IC, HA11226
Q401,403,405,407,409,471,473,475,477,485	89-318-155-01	Transistor, 2SC1815(GR)
Q415,487	89-110-155-01	Transistor, 2SA1015(GR)
D405,407,409,411,413,417,421,473,477,483,485,487,489,491,493,495	87-027-097-01	Diode, 1S1555
D415,419,425,471,475,497	88-052-188-11	Diode, 1S188(FM)
SFR401,405	87-021-634-01	Semi-fixed resistor, 10kΩ-B
SFR403,407	87-021-626-01	Semi-fixed resistor, 2kΩ-B
PIN	87-032-635-01	Pin, 5P
PIN	87-032-637-01	Pin, 7P
R435,481	87-025-271-01	< Resistors > 5.1kΩ ½w Metal film resistor
R401,431,475,499	87-025-272-01	13kΩ ½w Metal film resistor
C407	87-015-895-01	< Capacitors > 0.39μF 50V Electrolytic
C411,501	87-015-427-01	0.15μF 25V Aluminum solid
C429,431	87-015-429-01	0.33μF 25V Aluminum solid
C401,405,417,419,471,473,474,491,493	87-014-118-01	0.015μF PP
<< DOLBY-NR (R) CIRCUIT BOARD SECTION >>		
PCB-C	82-175-622-11	Dolby-NR (R) circuit board
IC402,404,406,408,416,472,474,476,478,486	87-027-738-01	IC, HA11226
	89-318-155-01	Transistor, 2SC1815(GR)

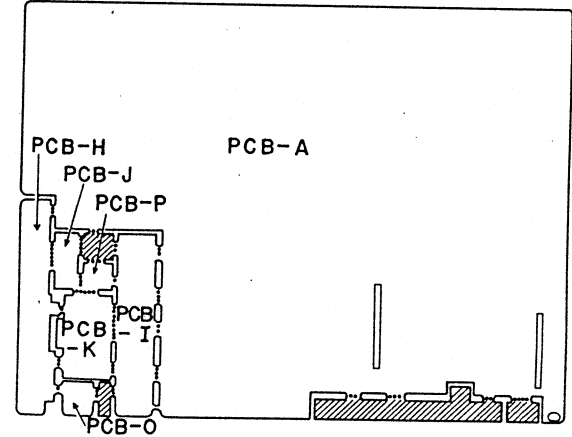
Symbol No.	Part No.	Description
Q416,488	89-110-155-01	Transistor, 2SA1015(GR)
D406,408	87-027-097-01	Diode, 1S1555
410,412,414,418,422,474,478,484,486,488,490,492,494,496		
D416,420,426,472,476,498	88-052-188-11	Diode, 1S188(FM)
SFR402,406	87-021-634-01	Semi-fixed resistor, 10kΩ-B
SFR404,408	87-021-626-01	Semi-fixed resistor, 2kΩ-B
PIN	87-032-635-01	Pin, 5P
PIN	87-032-637-01	Pin, 7P
R436,482	87-025-271-01	< Resistors > 5.1kΩ ½w Metal film resistor
R402,432,476,500	87-025-272-01	13kΩ ½w Metal film resistor
C408	87-015-895-01	< Capacitors > 0.39μF 50V Electrolytic
C412,502	87-015-427-01	0.15μF 25V Aluminum solid
C430,432	87-015-429-01	0.33μF 25V Aluminum solid
C402,406,418,420,472,492,494	87-014-118-81	0.015μF PP
<< SWITCH-1 CIRCUIT BOARD SECTION >>		
PCB-D	*	Switch-1 circuit board
S1,2,10	82-175-628-01	Push-switch (MONITOR, MPX FILTER, ADMS)
PIN	87-032-647-01	Pin, 17P
<< SWITCH-2 CIRCUIT BOARD SECTION >>		
PCB-E	*	Switch-2 circuit board
S5,6	82-175-627-01	Push-switch (DOLBY-NR, DOLBY B/C)
<< LED-1 CIRCUIT BOARD SECTION >>		
PCB-F	*	LED-1 circuit board
D601,604	87-027-775-01	LED, LT-9030DI
D602	87-027-776-01	LED, LT-9030N
D603	87-027-777-01	LED, LT-9030H
D607,608	87-027-774-01	LED, GL-9HY4
<< JACK CIRCUIT BOARD SECTION >>		
PCB-G	*	Jack circuit board
J5,6	87-049-057-01	Jack 6.3φ (MIC)
<< VOLUME CIRCUIT BOARD-1 SECTION >>		
PCB-H	*	Volume circuit board-1
VR1	82-175-625-01	Slide volume, 1kΩ-B (LH BIAS FINE)
VR2	82-175-624-01	Slide volume, 10kΩ-B (OUTPUT LEVEL)
<< FUSE CIRCUIT BOARD SECTION >>		
△PCB-I	*	Fuse circuit board
△F1	87-035-218-01	Fuse, "T" 400mA
	87-098-012-01	Fuse label "T" 400mA
△F2	87-035-221-01	Fuse, "T" 800mA
	87-098-015-01	Fuse label "T" 800mA

Symbol No.	Part No.	Description
	87-033-147-01	Fuse clamp
<< VOLUME CIRCUIT BOARD-2 SECTION >>		
PCB-J	*	Volume circuit board-2
VR3	87-021-679-01	Volume, 50kΩ-A
<< MECHA CIRCUIT BOARD SECTION >>		
PCB-K	*	Mecha circuit board
D260,262,263	87-027-097-01	Diode, 1S1555
<< LED-2 CIRCUIT BOARD SECTION >>		
PCB-L	82-175-611-11	LED-2 circuit board
D2	87-027-773-01	LED, GL-9NG4
D3	87-027-772-01	LED, SLP-152B
<< LED-3 CIRCUIT BOARD SECTION >>		
PCB-M	*	LED-3 circuit board
D1	87-027-772-01	LED, GL9PR4
<< SWITCH-3 CIRCUIT BOARD SECTION >>		
PCB-N	*	Switch-3 circuit board
S4	82-160-628-01	Slide switch (TAPE SELECTOR)
<< LED-5 CIRCUIT BOARD SECTION >>		
PCB-O	82-175-646-01	LED-5 circuit board
D615	87-027-775-01	LED, LT-9030DI
<< LED MODULE CIRCUIT BOARD SECTION >>		
PCB-Q	87-027-759-01	LED module circuit board
<< LED-4 CIRCUIT BOARD SECTION >>		
PCB-R	82-175-619-01	LED-4 circuit board
D612	87-027-646-01	LED, SEL1112(R)
D613	87-027-648-01	LED, SEL1331(G)
D614	87-027-647-01	LED, SEL1941(D)
<< MISCELLANEOUS >>		
△T1	82-175-603-01	Power transformer
PL1	82-175-630-01	Pilot lamp 15V 50mA
RPH	87-046-199-01	REC/PB head
EH	87-046-196-01	Erase head
M1	87-045-135-01	Motor, DC-EG
S3	87-031-361-01	Leaf switch (PAUSE)
S7	87-031-537-01	Micro switch (PLAY)
S8	87-031-669-01	Leaf switch (STOP)
S9	87-031-491-01	Micro switch (REC/PB)
S11	87-031-615-01	Leaf switch (REV/CUE)
△S12	87-031-640-01	Push switch (POWER)
S13	87-031-548-01	Leaf switch (MOTOR)
J7	82-168-633-01	Headphone jack (PHONES)
△C1	87-034-877-01	AC power cord (E model only)
	87-034-872-01	AC power cord (K model only)
	87-085-166-01	Holder, AC power cord
	87-019-104-01	< Capacitor > 0.01μF Spark killer

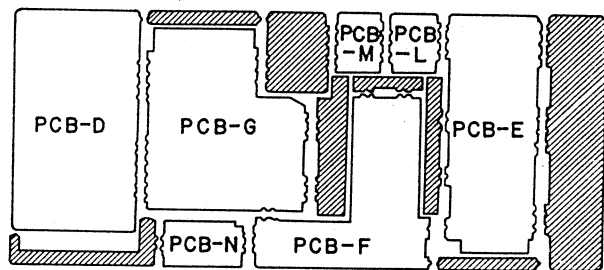
△ Safety component symbol
This symbol is given to important parts which serve to maintain the safety of the product, and which are made to conform to special safety specifications. Therefore, when replacing a component with this symbol, make absolutely sure that you use a designated part.

Note; Combination Circuit Board
The parts on the electrical parts list which are indicated by an asterisk (*) are supplied as one single combined circuit board. Therefore, they will not be supplied separately. If this becomes necessary, please order the entire circuit board.

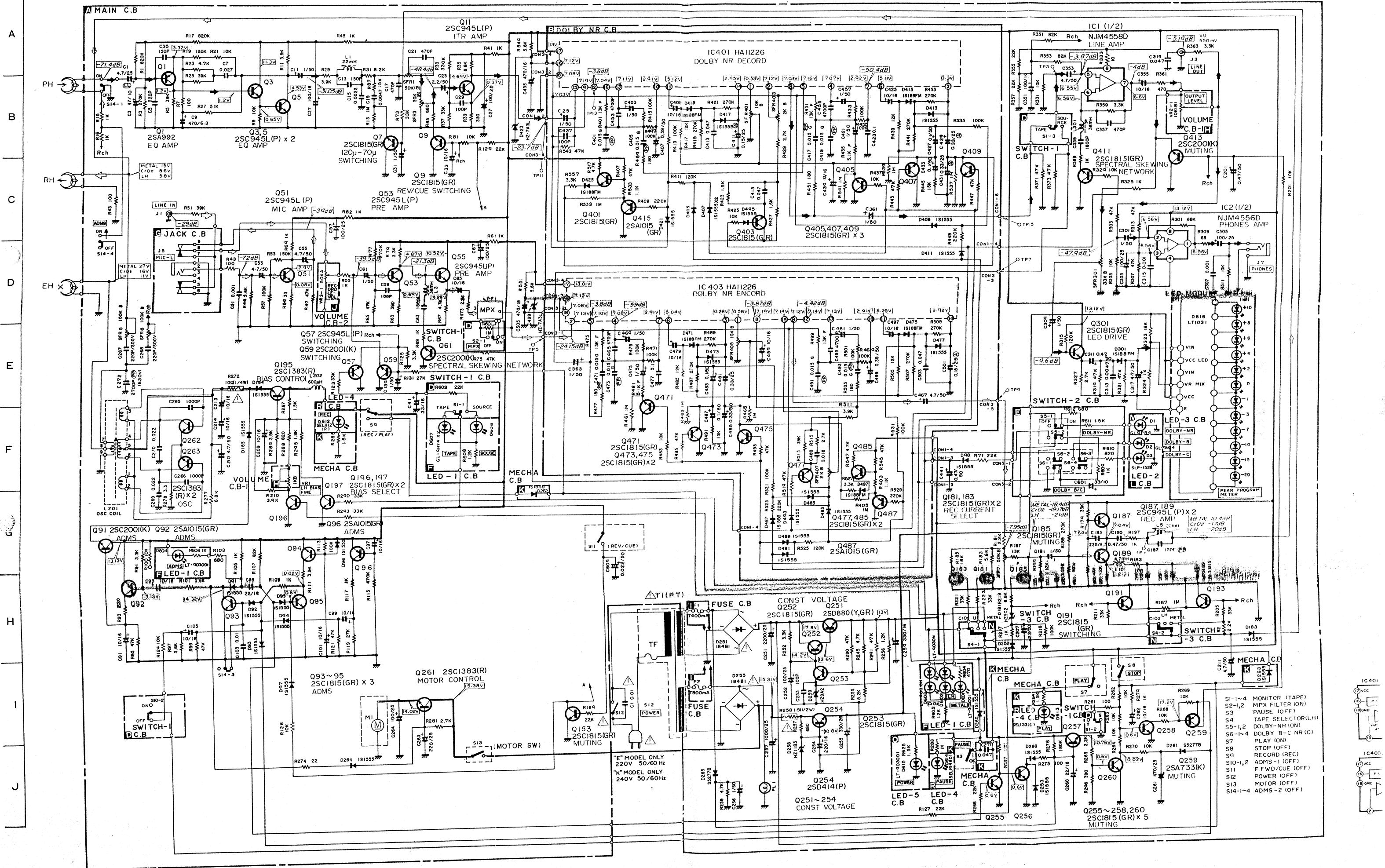
Combination circuit board A 82-175-635-01



Combination circuit board B 82-175-612-01



1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
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- 1)  B (+) power supply
- 2)  Signal path
 Rec path,
- 3) The voltage is the reference value measured with a tester (20 k-ohms/V DC) when there are no signals. An asterisk (*) indicates that the value was measured with a vacuum-tube voltmeter during recording.
- 4) Resistors with no designation have a rated power of 1/4W and a tolerance of $\pm 5\%$.
- 5) Capacitors with no designation have a dielectric strength of less than 50WV.
- 6) The only capacitor tolerances indicated are $\pm 2\%$ (G), $\pm 5\%$ (J) and $\pm 10\%$ (K).
- 7) Ceramic capacitor symbols:
 High dielectric constant system (YW, YP, YZ)
- 8) Explanation of symbols
 Mylar capacitor
 Aluminum solid capacitor
 Polypropylene film capacitor
 Low-leakage capacitor
 Fuse resistor
 Nonflammable resistor

 Safety component symbol

This symbol is given to important parts which serve to maintain the safety of the product, and which are made to conform to special safety specifications. Therefore, when replacing a component with this symbol, make absolutely sure that you use a designated part.

- This schematic diagram is subject to change without notice in the interests of improved performance.

